

USA Comments - Terrestrial Animal Health  
Standards Commission - February 2015 Report

DRAFT CHAPTER 6.X.

PREVENTION AND CONTROL OF *SALMONELLA*  
IN COMMERCIAL CATTLE PRODUCTION SYSTEMS

Article 6.X.1.

**Introduction**

Nontyphoidal salmonellosis is one of the most common food-borne bacterial diseases in the world with *Salmonella* Enteritidis and *S. Typhimurium* (including monophasic variants) the predominant serotypes identified in most countries. In addition, a limited number of other serotypes associated with cattle may cause salmonellosis in humans, for example *S. Dublin* and *S. Newport*.

As is the case in most food producing *animals*, *Salmonella infection* in cattle is mostly subclinical, although clinical *disease* such as enteritis, septicaemia or abortion can occur. Subclinical *infection* can be of variable duration including a carrier state and can play an important role in the spread of *Salmonella* within and between *herds* and pose a public health risk.

*Herd* size and stocking density may influence the *risk* of introduction, dissemination or persistence of *Salmonella*; however, this is also dependent on geographical region, husbandry and other factors such as season and age.

*Salmonella* serotypes and their *prevalence* in cattle may vary considerably between farms, countries and regions. It is important for *Veterinary Authorities* to consider types of *Salmonella*, their occurrence and the *disease* burden in cattle and human populations if developing and implementing strategies for the prevention and control of *Salmonella* in cattle.

Article 6.X.2.

**Definitions**

**Commercial cattle production systems:** means those systems where the purpose of the operation includes some or all of the breeding, rearing and management of cattle for the production of *meat* and *meat products* or *milk* and *milk products*.

**Intensive cattle production systems:** ~~means commercial~~ these are systems where cattle are in confinement and are fully dependent on humans to provide for basic animal needs such as food, shelter and water on a daily basis.

**Extensive cattle production systems:** ~~means commercial~~ these are systems where cattle have the freedom to roam outdoors, and where the cattle have some autonomy over diet selection (through grazing), water consumption and access to shelter.

**Semi-intensive cattle production systems:** ~~means commercial~~ these are systems where cattle are exposed to any combination of both intensive and extensive husbandry methods, either simultaneously or variably according to changes in climatic conditions or physiological state of the cattle.

**Rationale:** The words “these are” suggested in the three definitions above, are the same as used in OIE Code Chapter 7.9.3. This chapter has already defined these terms for cattle, so this minor change maintains consistency between the chapters.

#### Article 6.X.3.

##### **Purpose and scope**

The purpose of this chapter is to provide recommendations for the prevention and control of *Salmonella* in cattle in order to reduce the burden of *disease* in cattle and the *risk* of human illness through food-borne contamination as well as human *infections* resulting from direct or indirect contact with cattle (e.g. via faeces or abortion material).

This chapter applies to cattle (*Bos taurus*, *B. indicus* and *B. grunniens*), water buffaloes (*Bubalus bubalis*) and wood bison (*Bison bison* and *B. bonasus*) kept in commercial cattle production systems.

This chapter should be read in conjunction with the Codex Alimentarius Code of Hygienic Practice for Meat (CAC/RCP 58-2005) and the Codex Alimentarius Code of Hygienic Practice for Milk and Milk Products (CAC/RCP 57-2004).

#### Article 6.X.4.

##### **Objectives of prevention and control measures**

It is recommended that prevention and control be focused on those types of *Salmonella* of greatest consequence to cattle or public health.

Reduction of *Salmonella* in cattle in primary production may reduce the level of the pathogen:

- 1) entering the *slaughterhouse/abattoir* and therefore decrease the *risk* of beef contamination during *slaughter* and dressing procedures;
- 2) in *milk* and *milk products*;
- 3) in the farm environment, thereby reducing the risk of dissemination of *Salmonella* and contact *infections* in humans.

Articles 6.X.5. to 6.X.14. provide recommendations for the prevention and control of *Salmonella* in cattle.

These recommendations may also have beneficial effects on the occurrence of other *infections* and *diseases*.

#### Article 6.X.5.

##### **Location and design of cattle establishments**

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When making decisions on the location and design of cattle *establishments*, it is recommended that mitigation of the *risk* of transfer of pathogens, including *Salmonella*, from major sources of contamination be considered. Sources of *Salmonella* may include other livestock *establishments* or areas of application or disposal of contaminated waste or effluent. Transfer of *Salmonella* between *establishments* may involve carriage by wild birds, rodents, flies and other *wildlife*.

It is recommended that the design of intensive cattle systems consider the following:

- 1) adequate drainage for the site and control of run-off and untreated waste water;
- 2) use of materials for construction that facilitate effective cleaning and *disinfection*;
- 3) control of the points of entry;
- 4) cattle handling and movements to minimise stress and spread of *Salmonella infection*;
- 5) separation of cattle of different *risk* status;
- 6) restriction of entry of wild birds, rodents, flies and other relevant *wildlife*.

In extensive cattle production systems, location and design options may be limited; however, applicable biosecurity measures should be considered.

#### Article 6.X.6.

##### Biosecurity management plan

Biosecurity measures that include management and physical factors designed to reduce the *risk* of introduction, establishment and spread of animal *diseases*, *infections* or *infestations* to, from and within an animal population would also be expected to assist with the prevention and control of *Salmonella*.

When developing a biosecurity management plan it is recommended that the following be taken into consideration:

- 1) Veterinary [and animal handler](#) supervision of cattle health.

**Rationale:** The animal handler is often the person closest to the cattle and should be considered when cattle health is concerned. Often times in rural or under developed settings the animal handler is the only person available to assist the cattle and maintain their health and safety. The animal handler and the veterinarian should collaborate on biosecurity measures to prevent *Salmonella*. This language is also consistent with the OIE Chapter on Animal Welfare and Beef Cattle Production Systems.

- 2) Management of introduction and mixing of cattle.
- 3) Training of personnel in their responsibilities and their role in animal health, human health and food safety.

- 4) Maintenance of records including data on cattle health, production, movements, medications, *vaccination*, and mortality, and cleaning and *disinfection* of farm buildings and equipment.
- 5) Availability of test results to the farm operator when *Salmonella surveillance* is conducted.
- 6) Removal of unwanted vegetation and debris that could attract or harbour pests around cattle premises .
- 7) Minimising the entry of wild birds into cattle buildings and feed stores.
- 8) Cleaning and *disinfection* procedures for buildings in which cattle are handled or housed. For example, the cleaning and *disinfection* procedures for intensive calf housing, calving areas and sick pens after emptying may include feeders, drinkers, floor, walls, aisles, partitions between pens, and ventilation ducting.

When disinfectants are used they should be applied at an effective concentration after a complementary cleaning procedure.

- 9) Control of pests such as rodents and arthropods when required and regular assessment of effectiveness.
- 10) Control of persons and *vehicles* entering the *establishment*.
- 11) Cleaning and *disinfection* of *vehicles* and equipment identified as a *risk*.
- 12) Storage and disposal of cattle carcasses, bedding, faeces and other potentially contaminated farm waste in a safe manner to minimise the risk of dissemination of *Salmonella* and to prevent the direct or indirect exposure of humans, livestock and *wildlife* to *Salmonella*. Particular care to be taken when cattle bedding and faeces are used as fertiliser for horticultural crops intended for human consumption.

#### Article 6.X.7.

#### **Management of cattle introductions**

To minimise the *risk* of introducing *Salmonella* through cattle introductions, it is recommended that:

- 1) There be good communication within the cattle industry to raise awareness of the *risk* of introducing *Salmonella* through cattle introductions.
- 2) The number of separate sources of cattle for breeding or rearing be kept to as few as possible. For example in a closed dairy *herd* it is possible to introduce new genetic material solely by semen or embryos.
- 3) If possible, cattle be sourced directly from *herds* of origin because live animal markets or other places where cattle from multiple properties are mixed for resale may increase the risk of spread of *Salmonella* and other *infections* among cattle.
- 4) Newly introduced cattle be kept separate from the rest of the *herd* for a suitable period before mixing with other cattle, e.g. four weeks.
- 5) Where appropriate, for example with cattle of unknown status, pooled faecal samples from introduced cattle could be taken to assess their *Salmonella* status.

#### Article 6.X.8.

##### On farm cattle management

To minimise the risk of transferring *Salmonella* among cattle, it is recommended that:

- 1) Cattle with suspected salmonellosis be separated from healthy cattle.
- 2) Care of healthy cattle be carried out prior to care of cattle with suspected salmonellosis.
- 3) Priority be given to the hygienic management of calving areas, for example keeping perinatal cattle separated from sick cattle and maintaining a clean environment.
- 4) When possible, the 'all-in-all-out' principle for production cohorts be used. In particular, the mixing of different age groups during rearing of calves should be avoided.
- 5) Consideration be given to the potential for between-herd transmission of *Salmonella* via rearing and grazing of cattle from multiple sources on a single site, for example shared pasture and heifer rearing.
- 6) Consideration be given to the potential for between-herd transmission of *Salmonella* through direct contact between cattle across boundary lines or indirectly through contamination of water courses.

#### Article 6.X.9.

##### Feed and water

###### 1. Compound feed and feed ingredients

Compound feed and feed ingredients can be sources of *Salmonella infection* for cattle. For the effective control of *Salmonella* it is recommended that:

- a) Where appropriate, compound feed and feed ingredients be produced, handled, stored, transported and distributed according to Good Manufacturing Practices, considering Hazard Analysis Critical Control Points (HACCP) principles and recommendations in accordance with Chapter 6.3.
- b) Compound feed and feed ingredients be transported and stored in a hygienic manner that minimises access by wild birds, rodents and other *wildlife*.

###### 2. Water

Where there is reason to be concerned about *infection* of cattle with *Salmonella* from contaminated water, measures be taken to evaluate and minimise the *risk*. For example sediment in water troughs may act as a reservoir for contamination.

#### Article 6.X.10.

##### Prevention, treatment and control measures

- 1) *Antimicrobial agents* may modify normal flora in the gut and increase the likelihood of colonisation by *Salmonella*. If *antimicrobial agents* are used, they should be used in accordance with Chapter 6.9.

*Antimicrobial agents* should not be used to control subclinical *infection* with *Salmonella* in cattle because the effectiveness of the treatment is limited, they may increase the risk of *Salmonella* colonisation, and their use can contribute to the development of antimicrobial resistance.

- 2) *Vaccination* may be used as part of a *Salmonella* control programme. Vaccine production and use should be in accordance with the *Terrestrial Manual*. The protective effect of vaccines is generally serotype specific and few licensed vaccines are available for cattle.
- 3) Use of probiotics may reduce colonisation of cattle by *Salmonella* and shedding of *Salmonella*; however, efficacy is variable.
- 4) Because conditions such as liver fluke and infection with bovine viral diarrhoea virus may increase the susceptibility of cattle to *Salmonella*, control of these conditions is recommended.
- 5) The immune status of calves is important and therefore care should be taken to ensure that newborn calves consume adequate amounts of high quality colostrum.

Article 6.X.11.

#### **Transportation**

The relevant recommendations in Chapter 7.3. apply.

When transporting animals from multiple *establishments*, it is recommended that the *Salmonella* status of the *establishments* be considered to avoid cross-contamination of cattle.

Article 6.X.12.

#### **Lairage**

Relevant aspects of *lairage* management include consideration of effective cleaning and *disinfection* between groups, minimising mixing of separate groups and managing stress.

In addition the relevant recommendations in Articles 7.5.1., 7.5.3. and 7.5.4. apply.

Article 6.X.13.

#### **Surveillance in cattle**

*Surveillance* data provide information to assist the *Competent Authorities* in their decision making regarding the requirement for, and design of, control programmes. Sampling and testing methods, frequency and type of samples required should be determined by the *Veterinary Services*.

Standards for diagnostic tests are described in the *Terrestrial Manual*. In addition, other sampling and testing methodologies such as testing of bulk milk or serum samples by ELISA may provide useful information on herd or individual animal status. Boot swab samples from communal areas in cattle housing, slurry samples or lymph nodes collected post-mortem can also be useful for microbiological testing. Some types of *Salmonella* such as *S. Dublin* can be difficult to detect through microbiological methods.

If *vaccination* is used, it may not be possible to distinguish between vaccinated and infected cattle by means of serological testing.

Article 6.X.14.

#### **Prevention and control in low prevalence regions**

In regions where *Salmonella infection* of cattle is uncommon, it may be possible to eliminate *infection* from *herds* through a combination of *herd surveillance*, individual testing, movement controls, and possible removal of persistent carriers.

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